

Customer 1

100

DC 2 \sim_{105}
O

Customer 2
★ \sim_{102}

Customer 8
★ \sim_{102}

Customer 7
★ \sim_{102}

Customers 1, 4 & 5
★ \sim_{102}

Customer 9
★ \sim_{102}

Customer 6 \sim_{102}
★

DC 1
O \sim_{105}

Customer 3
★ \sim_{102}
DC 3
O \sim_{105}

Fig. 1A

Example Direct Shipping Cost Database (cost per 5 lbs.)

		112a	112b	112c	...	112d
		Distribution Center ("DC") 1	DC 2	DC 3		DC N
111a	0-5 miles, courier	\$10.00	-	-	...	-
111b	0-150 miles, domestic ground	\$2.25	\$2.00	\$2.00		\$2.00
111c	150-1000 miles, domestic ground	\$3.00	\$2.50	\$2.50		\$3.00
111d	1000-2500 miles, domestic ground	\$4.00	\$3.50	\$3.50		\$4.50
111e	2500+ miles, domestic ground	\$5.00	\$4.50	\$4.50		\$6.00
111f	0-3000 miles, domestic next day air	\$8.50	\$8.50	\$8.50		\$8.00
111g	3000+ miles, domestic next day air	\$12.00	\$12.00	\$12.00		\$11.00
111h	0-3000 miles, foreign air	-	\$19.00	\$19.00		\$20.00
		⋮				

Figure 1B

Example Direct Labor Cost Database

		116a	116b	116c	...	116d
		DC 1, Processing Lane 1	DC 1, Processing Lane 2	DC 2, Processing Lane 1		DC N, Processing Lane M
115a	Order Type 1	\$0.50	\$0.50	\$0.75	...	-
115b	Order Type 2	-	\$0.75	\$0.75		-
115c	Order Type 3	\$1.00	-	\$0.75		-
		⋮				
115d	Giftwrapping	-	\$2.00	-		\$2.00
		⋮				

Figure 1C

Example Direct Packing Material Cost Database

		120a	120b	...	120c
		DC 1	DC 2		DC N
119a	Order Type 1	\$0.50	\$0.50	...	\$0.50
119b	Order Type 2	\$0.20	\$0.25		-
		⋮			

Figure 1D

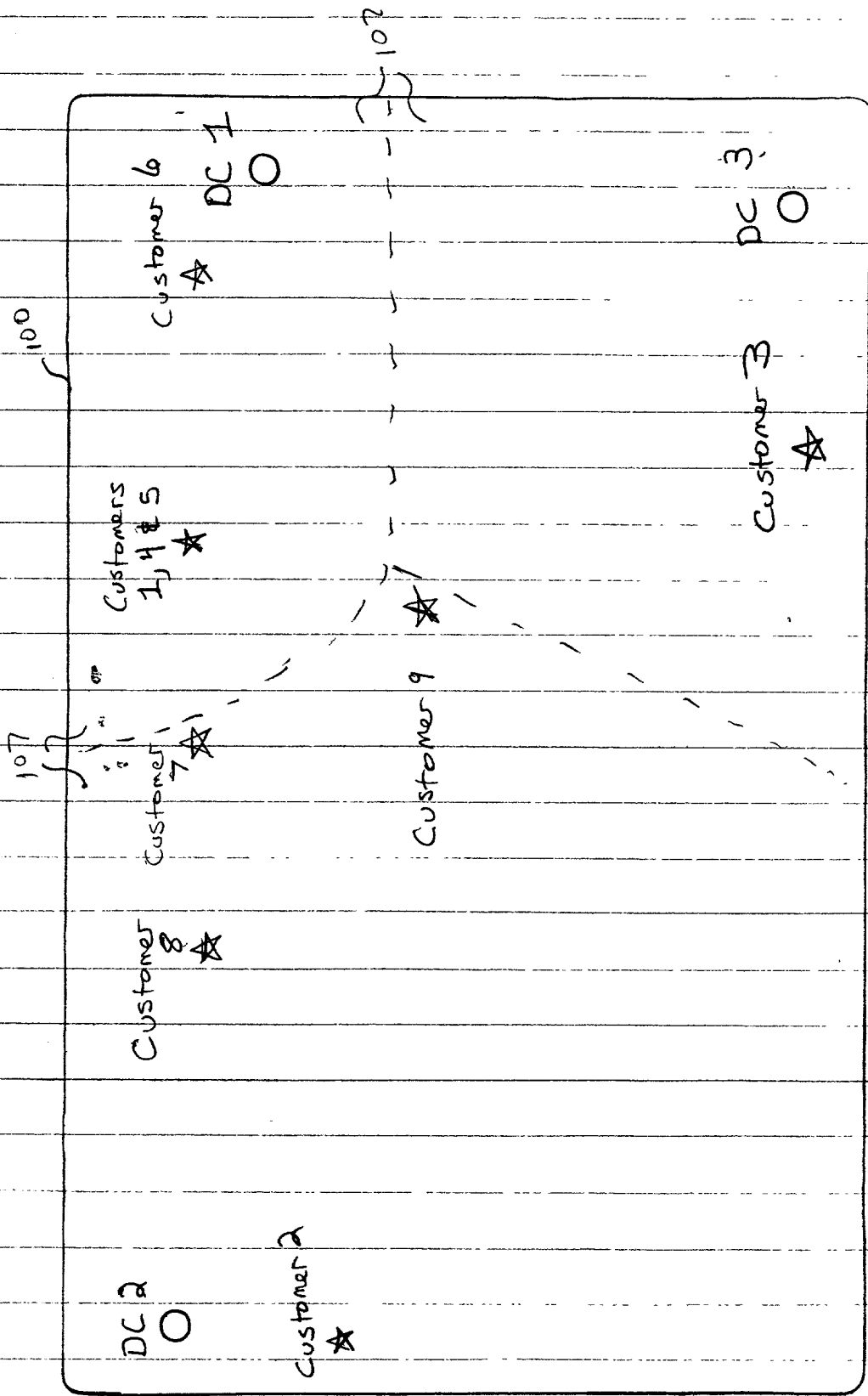


Fig. 1E

Example Estimated Customer Goodwill Cost From Expected Delivery Date Deviation Database

		124a	124b	124c	
		Customer 1	Customer 2	Customer 3	
		⋮			
123a	1 day early	\$-5.00	-	\$-1.00	...
123b	on-time	-	-	\$-0.50	
123c	1 day late	\$2.00	\$2.00	\$1.00	
123d	2 days late	\$5.00	\$2.50	\$1.00	
123e	3 days late	\$10.00	\$3.00	\$2.00	
123f	4 days late	\$25.00	\$5.00	\$1.75	
		⋮			

Figure 1F

Example Estimated Customer Goodwill Cost From Expected Order Split Deviation Database

		128a	128b	128c	
		Customer 1	Customer 2	Customer 3	
		⋮			
127a	1 less order split	\$-2.50	-	\$-0.25	...
127b	expected # of order splits	-	-	\$-0.10	
127c	1 more order split	\$0.50	\$0.50	\$0.25	
127d	2 more order splits	\$1.25	\$0.65	\$0.25	
127e	3 more order splits	\$2.50	\$0.75	\$0.50	
127f	4 more order splits	\$6.25	\$1.25	\$0.40	
		⋮			

Figure 1G

Example New Order Optimal Allocation Database

		132a	132b	132c		132d
		DC 1, Processing Lane 1	DC 1, Processing Lane 2	DC 2, Processing Lane 1		DC N, Processing Lane M
		⋮				
131a	7am-8am EST Order Type 1	25	15	60	...	-
131b	7am-8am EST Order Type 2	-	30	10		-
		⋮				
161c	8am-9am EST Order Type 1	25	25	50		-
161d	8am-9am EST Order Type 2	-	30	20		-
		⋮				

Figure 1H

Example New Order Actual Allocation Differential

		136a	136b	136c		136d
		DC 1, Processing Lane 1	DC 1, Processing Lane 2	DC 2, Processing Lane 1		DC N, Processing Lane M
		⋮				
135a	7am-8am EST Order Type 1	-	+30	-5	...	-
135b	7am-8am EST Order Type 2	-	+5	-5		-
		⋮				

Figure 1I

Example New Order Allocation Adjustment Formula

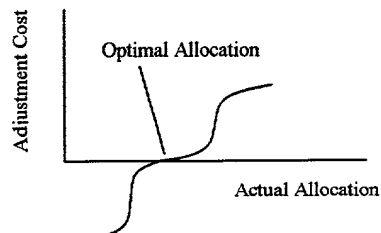


Figure 1J

Example Order Fulfillment Plan Option Comparison (for order by Customer 1 of Type 2 with 2 items)

	140a	140b	140c	140d	140e	140f	140z
	Direct Shipping Cost	Direct Labor Cost	Direct Packing Material Cost	Delivery Date Customer Goodwill Cost	Order Split Customer Goodwill Cost	Allocation Adjustment Cost	Total Cost
139a	both items from DC 1, Processing Lane 2; standard shipping	\$3.00	\$0.75	\$0.20	-	\$0.25	\$4.20
139b	both items from DC 2, Processing Lane 1; standard shipping	\$3.50	\$0.75	\$0.25	-	-\$1.00	\$3.50
139c	item 1 from DC 1, Processing Lane 2; and item 2 from DC 2, Processing Lane 1; standard shipping	\$6.50	\$1.50	\$0.45	\$0.50	-\$0.35	\$8.60
	∴						
139d	both items from DC 1, Processing Lane 2; Next Day Air shipping	\$8.50	\$0.75	\$0.20	-\$5.00	\$0.25	\$4.70
	∴						

Figure 1K

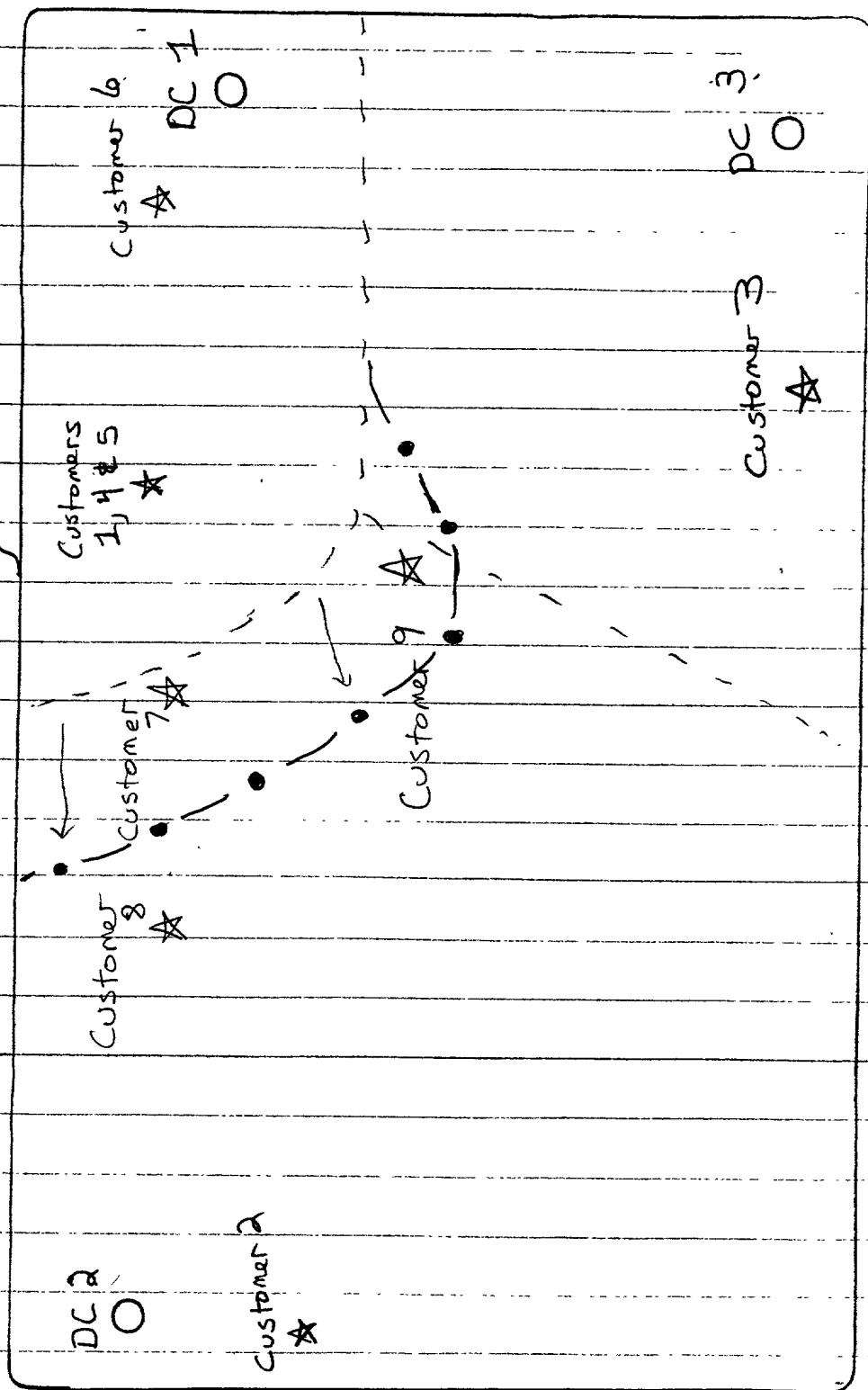


Fig. 1L

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A Day Without Rain

~ Enya

Kenny Loggins Alive (1981)



DVD
Rated: NR

List Price: \$24.98
Our Price: \$21.49
You Save: \$3.49 (14%)

Actual Delivery Time:

- IF standard shipping is used, this item will be delivered to you on 09/08/XX.
- IF Next Day Air shipping is used, this item will be delivered to you on 09/04/XX.

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Edition Details:

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- Color
- Track Listing: 1. All Alone Tonight, 2. I Believe In Love, 3. Love Has Come Of Age, 4. Lady Luck, 5. Angry Eyes, 6. I'm Alright, 7. House Of Pooh Corner, 8. Danny's Song, 9. Junkanoo Holiday, 10. Celebrate Me Home, 11. Mr. Night, 12. This Is It, 13. Keep The Fire
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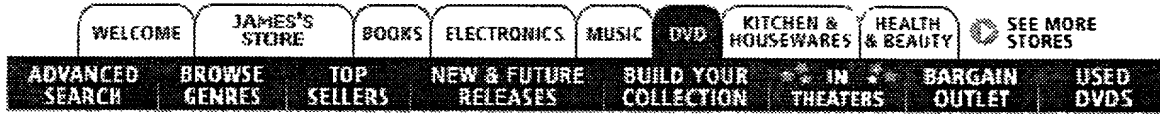
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Fig. 2A

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A Day Without Rain

~ Enya

Kenny Loggins Alive (1981)



List Price: \$24.98
Our Price: \$21.49
You Save: \$3.49 (14%)

Actual Delivery Information

IF default ordering is used, this item will be shipped from the Seattle distribution center on 09/03/XX and will be received by you on 09/08/XX, with a total cost of \$27.19.

Rated: NR

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I have one to sell! Sell yours here

Edition Details:

- Region 1 encoding (US and Canada only)

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Ship to:

Work - Std Shipping

Work - Std Shipping - 09/08/XX

Work - Next Day Air - 09/04/XX + \$5.50

Home - Std Shipping - 09/07/XX - \$0.50

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Customer 1, [rate this item](#) to get personal recommendations.

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Fig. 2B

Please review and submit your order

By placing your order, you agree to Amazon.com's privacy notice and conditions of use.

Important Message

We've changed our checkout process! You'll get all the same features, but fewer pages to view before placing your order. Your default shipping address and other settings are shown below. Use the buttons to make any changes; when you're done, click the "Place your order" button.

Click the "Place your order" button to complete your purchase.  **Place your order**

Shipping to: [Change](#)

Customer 1
Work
123 Main St.
Seattle, WA 98101

Shipping Options: [Learn more about shipping prices and policies](#)

- ☒ Standard Shipping From the Seattle DC
(09/08/XX - \$3.50)
- ☐ Next Day Air (09/04/XX - \$8.50)
- ☐ Standard Shipping + Enhanced Priority Processing (09/07/XX - \$5.50)
- ☐ Next Day Air + Immediate Processing (09/03/XX at 10:30am - \$16.50)
- ☐ Standard Shipping From the Atlanta DC (09/08/XX - \$3.85)
- ☐ Standard Shipping from the Disadvantaged Youth Processing Lane (09/07/XX - \$4.50 + \$1.50)

Kenny Loggins Alive Kenny Loggins (Primary Contributor)

\$21.49 - Quantity : 1 Usually ships in 2-3 days

Gift Options: None [Change](#)

Order Summary

Items:	\$21.49	} 225
Shipping & Handling:	\$3.50	
Total Before Tax:	\$24.99	} 235
Tax:	\$2.30	

Order Total: \$27.19

Have a gift certificate or promotional code?

Enter code here:

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[Learn more about gift certificates](#)

Payment Method:

[Change](#)

MasterCard: ***- 12345

Exp: 12/2003

 **Place your order**

Fig. 2C

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BOOKS

MUSIC

DVD

ELECTRONICS

KITCHEN &
HOUSEWARES

VIDEO

TOOLS &
HARDWARE

Your Account > Order History > Order Summary #104-1234567

Order Placed: Sept. 2, 20XX at 02:45 PM PDT

Order Total: \$27.19

When will your items arrive?

Not Yet Shipped: Item 1 will arrive at the Seattle DC from external inventory storage by 5pm on 09/02/XX, and will be behind approximately 100 orders in a queue of orders ready for processing by Processing Lane 3. Order processing will begin at approximately 8am on 09/03/XX and will be completed by 8:30am on 09/03/XX. The order will be shipped from the DC at approximately 10am on 09/03/XX by ABC Shipping.

Delivery Time: 09/08/XX

Shipping Address: [Change](#)

Customer 1
Work
123 Main St.
Seattle, WA 98101

Items Ordered

1 of: **Kenny Loggins Alive** Kenny Loggins

Price

\$21.49

- Availability: 1 in stock

- Gift-wrap and note: None [Change](#)

Shipping Method: [Change](#)

Standard Shipping

Shipping Option: One
shipment when complete
order is ready.

Item(s) Subtotal: \$21.49
Shipping & Handling: \$3.50

Total Before Tax: \$24.99
Estimated Tax: \$2.20

Grand Total for This Order: \$27.19

Fig. 2D

amazon.com.

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DVD

GO!

Kenny Loggins Alive (1981)



List Price: \$24.98
Our Price: \$21.49
You Save: \$3.49 (14%)

Actual Delivery Time:

Using standard shipping,
this item will be delivered
to you on 09/07/XX.
Other manners of shipping
are not available to you.

DVD
Rated: NR

BUY & SELL USED ITEMS

Get it for less! Order it used

I have one to sell! Sell yours here

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A Day Without Rain
~ Enya

Customer 2, rate this item to get personal recommendations.

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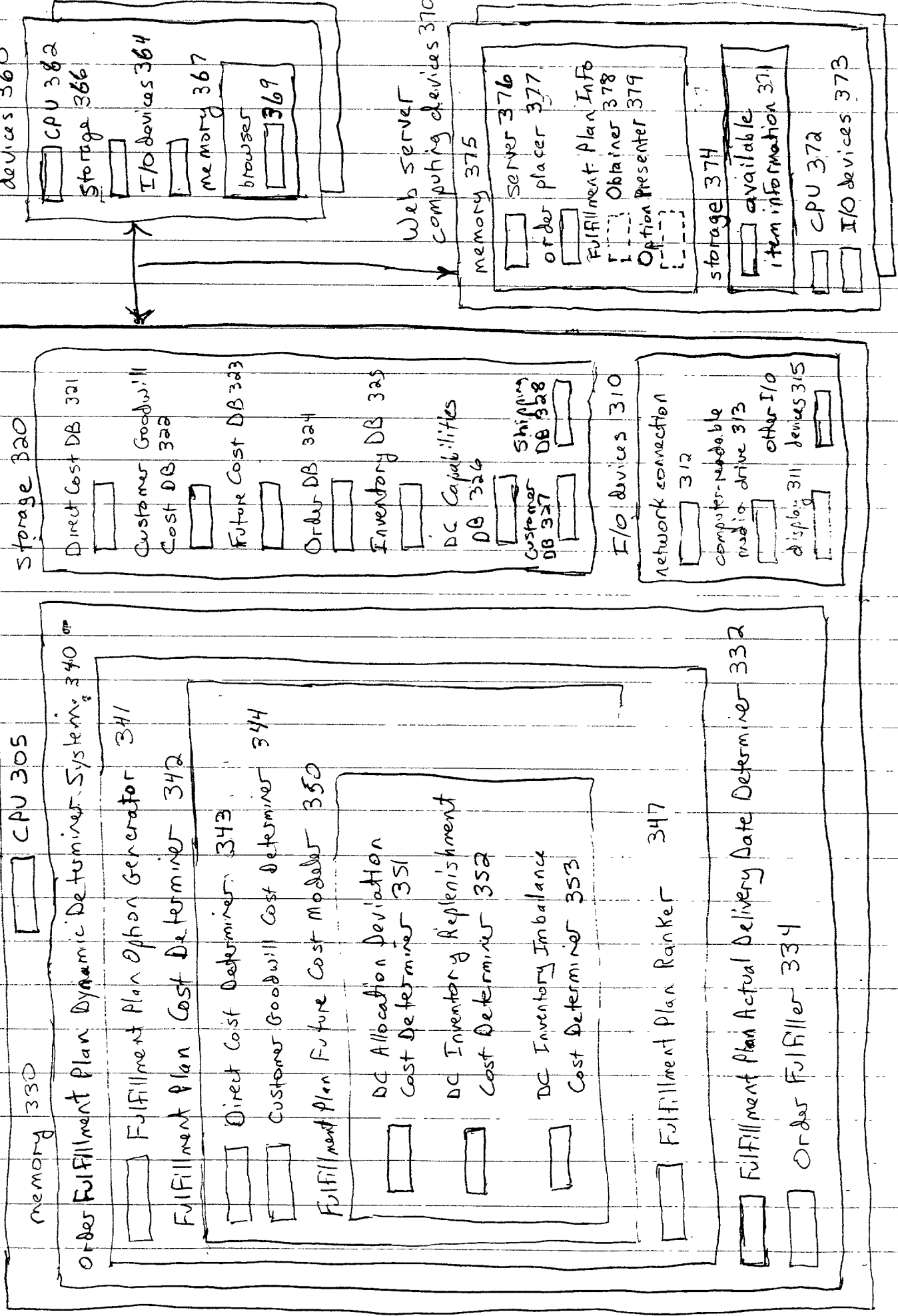
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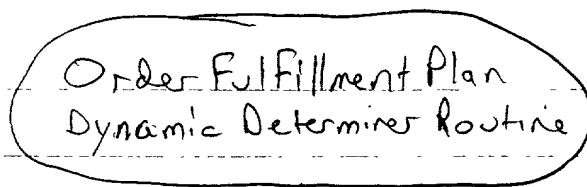
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[View my Wish List](#)

Fig. 2E

Fig. 3

order fulfillment computer system 300





400

Fig. 4

Receive indication of potential order for customer

405

Generate fulfillment plan options

410

Select next fulfillment plan option

415

Determine fulfillment plan cost

420

More?

Yes

No

Rank fulfillment plans

430

Provide ranked list of fulfillment plan options

435

More?

Yes

No

END

499

FIG. 4

Fig. 5

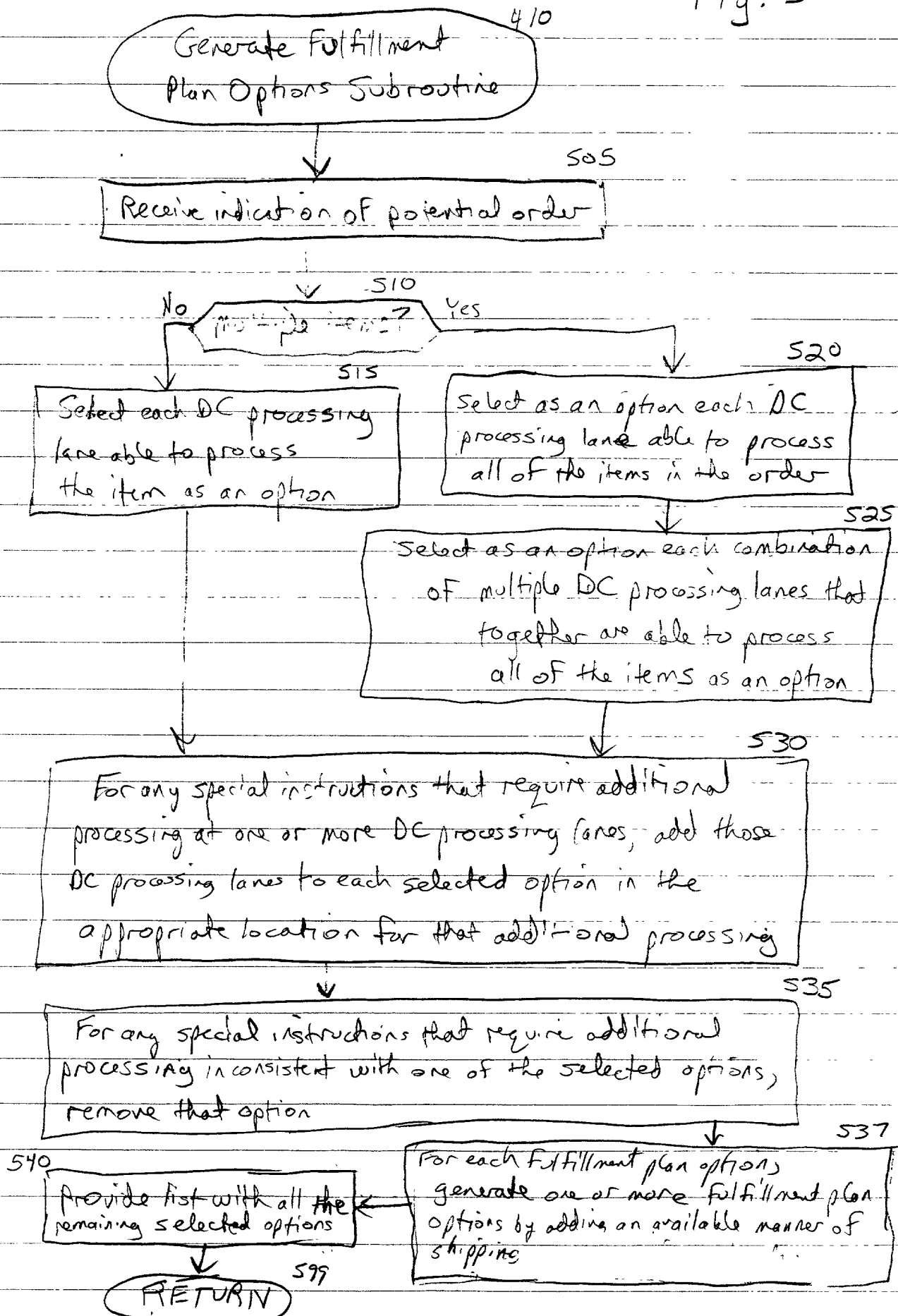
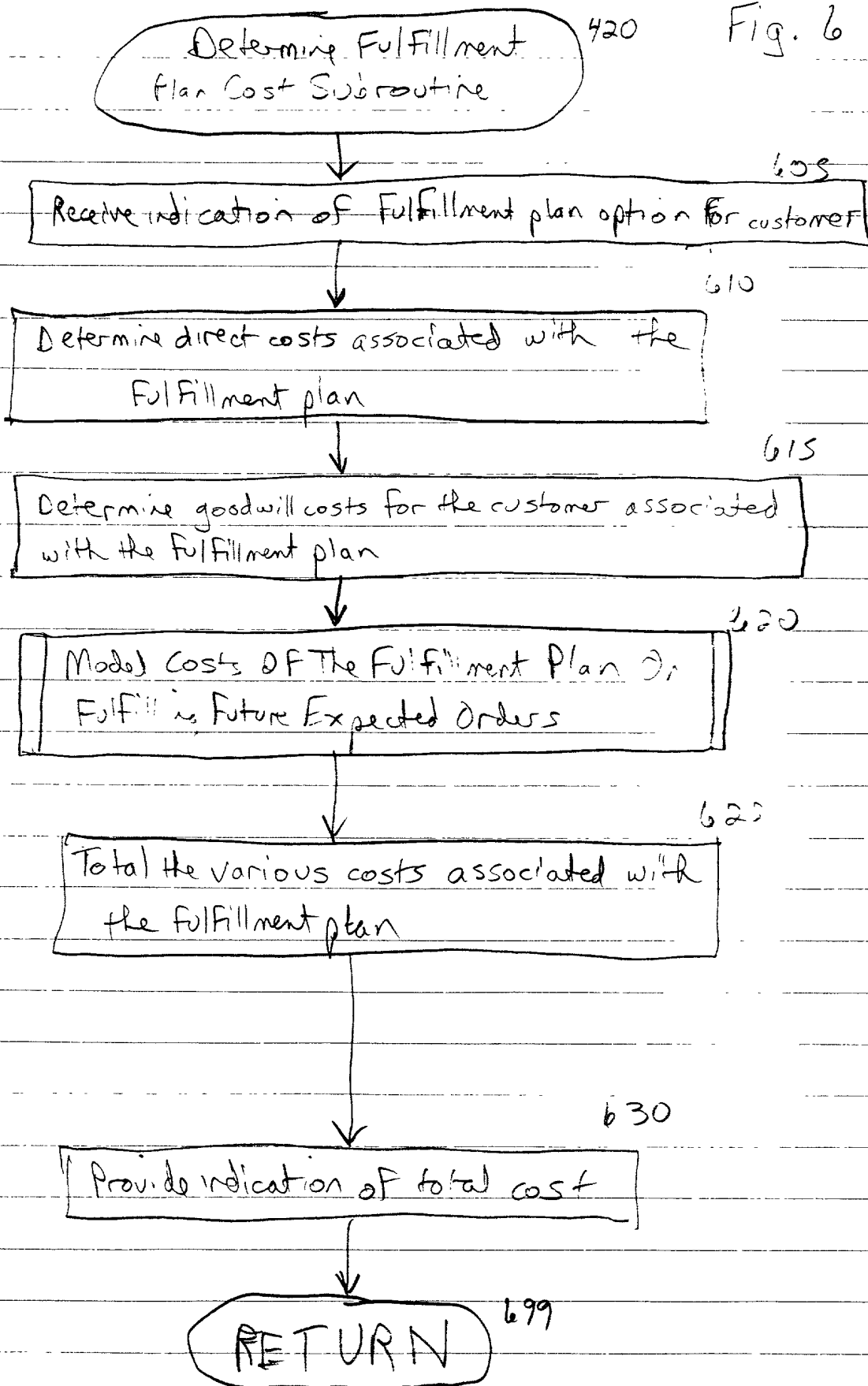


Fig. 6



Model Fulfillment Plan Future
Costs Subroutine

Receive indication of fulfillment plan option for customer

Assign cost to any additional deviation caused by
Fulfillment plan from optimal or expected allocation for
processing lane(s) that will fulfill the plan

Assign costs of any future inventory replenishments
that will be incurred to fulfill future orders based on
fulfilling this order

Assign cost associated with any current imbalance in
inventory of the ordered items among the DCs

Total the costs assigned to the fulfillment plan
to represent impact on fulfilling future orders

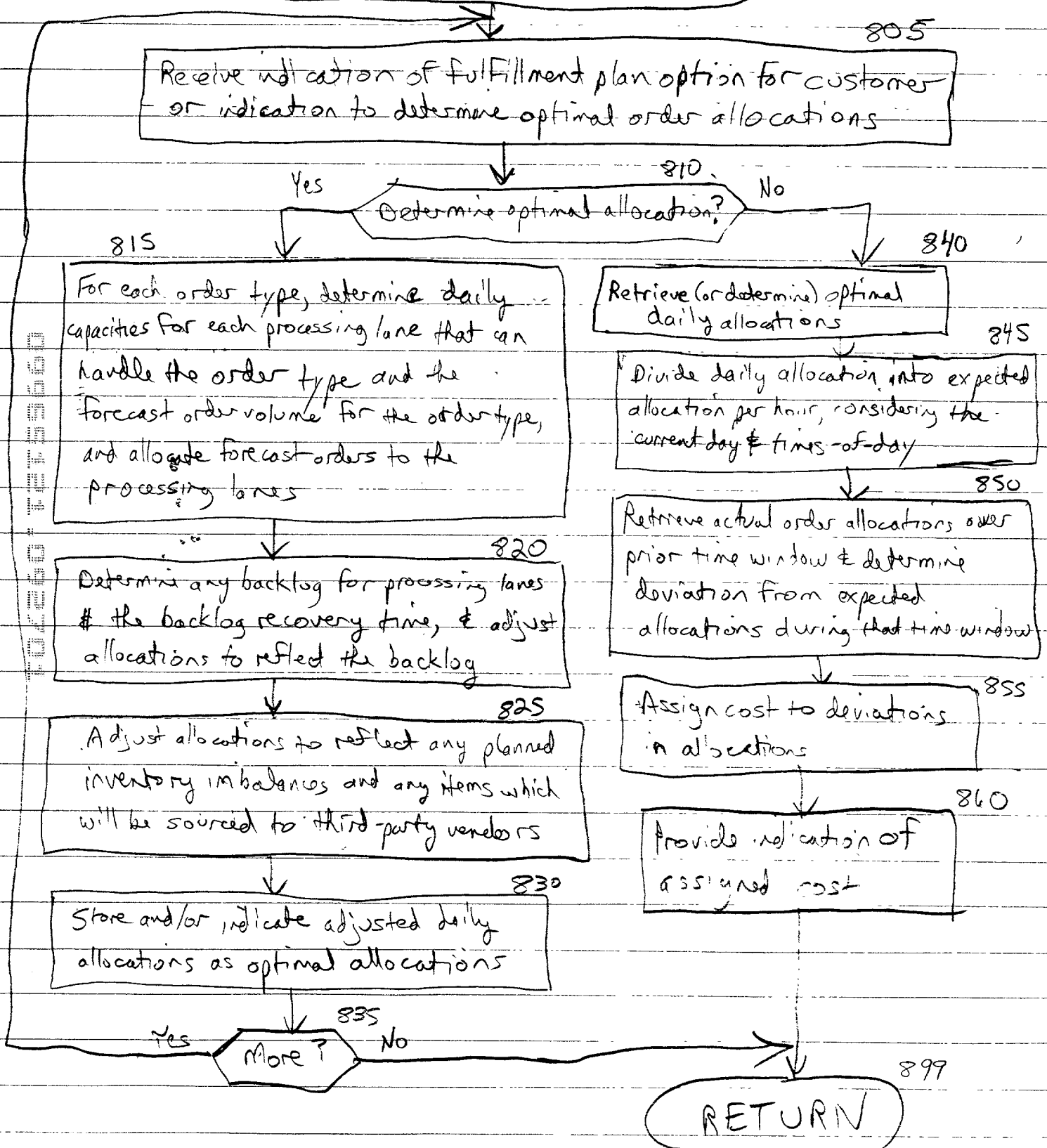
Provide indication of totaled cost

RETURN

Assign Allocation Location
Cost Subroutine

710

Fig. 8



Assign Inventory Imbalance Costs Subroutine

905
Receive indication of fulfillment plan option for customer or indication to determine expected run rates for some or all items

910
Determine expected run rates?

Yes

No

915
Foreach item of interest and each DC that supplies the item, determine daily expected run rates for that item in the region typically served by that DC by analyzing historical purchase patterns and considering day-based variations, regional demand, and any other available relevant information

930
Retrieve (or determine) daily expected run rates for each combination of DC and item to be fulfilled from that DC for the fulfillment plan

935
Retrieve actual run rates over prior time window for each item in the order at the DC from which it is to be fulfilled, & determine deviation from expected run rate during that time window for that item at that DC

920
Store and/or indicate daily expected run rates for the items of interest and the DCs

940
Assign cost to deviations in allocations

945
Provide indication of assigned cost

Yes

925
More?

No

999
RETURN

430

Fig. 11

Rank Fulfillment
Plans Subroutine

Receive indications of fulfillment
plans and of determined associated costs

Optionally receive indication of ranking criteria

No

Indicated ranking criteria?

Yes

Rank Fulfillment plans
based on associated costs

Rank fulfillment plans
based on indicated criteria

Provide ranked list of Fulfillment options

RETURN

FIG. 11

Fig. 12

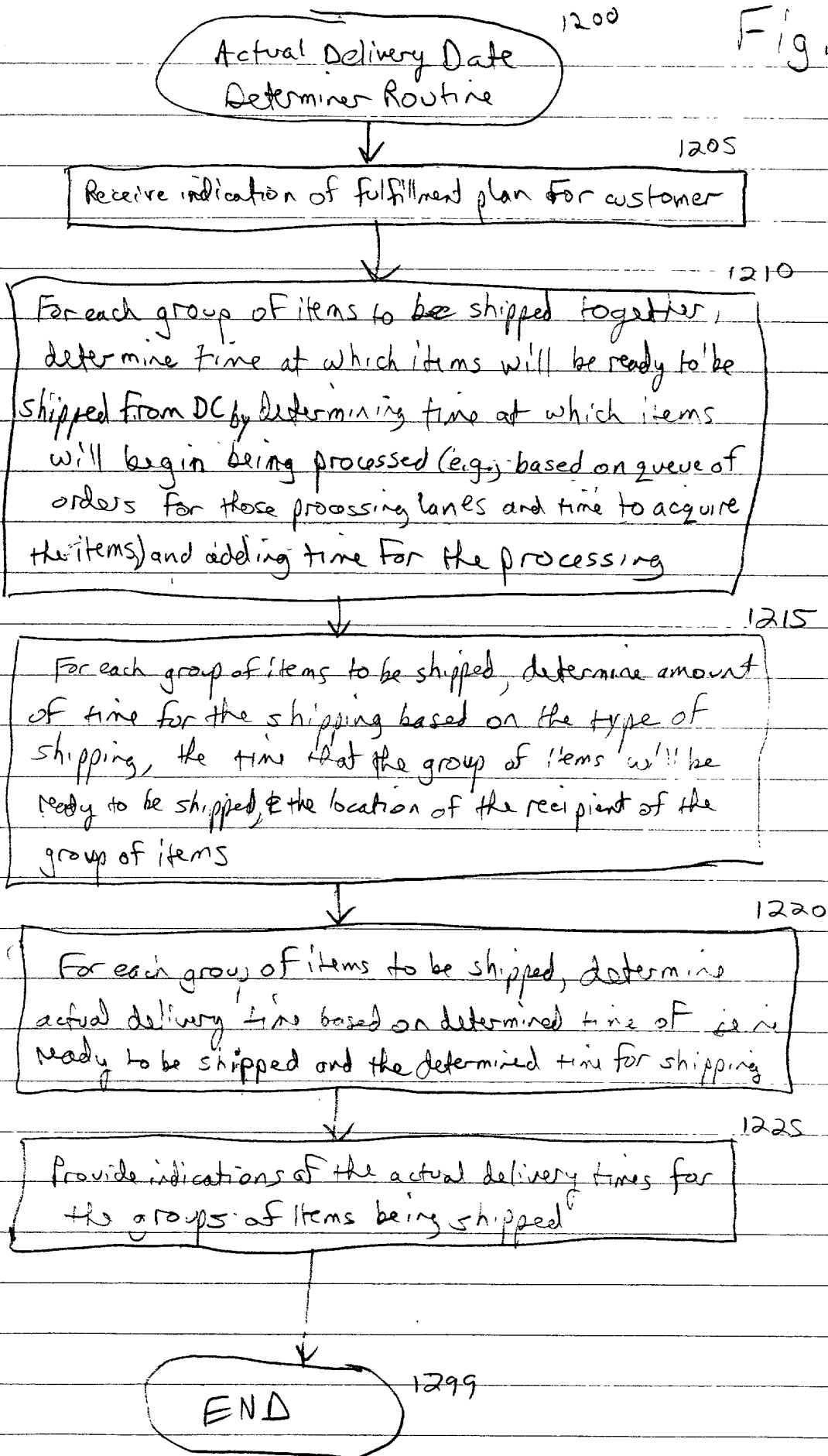


Fig. 13

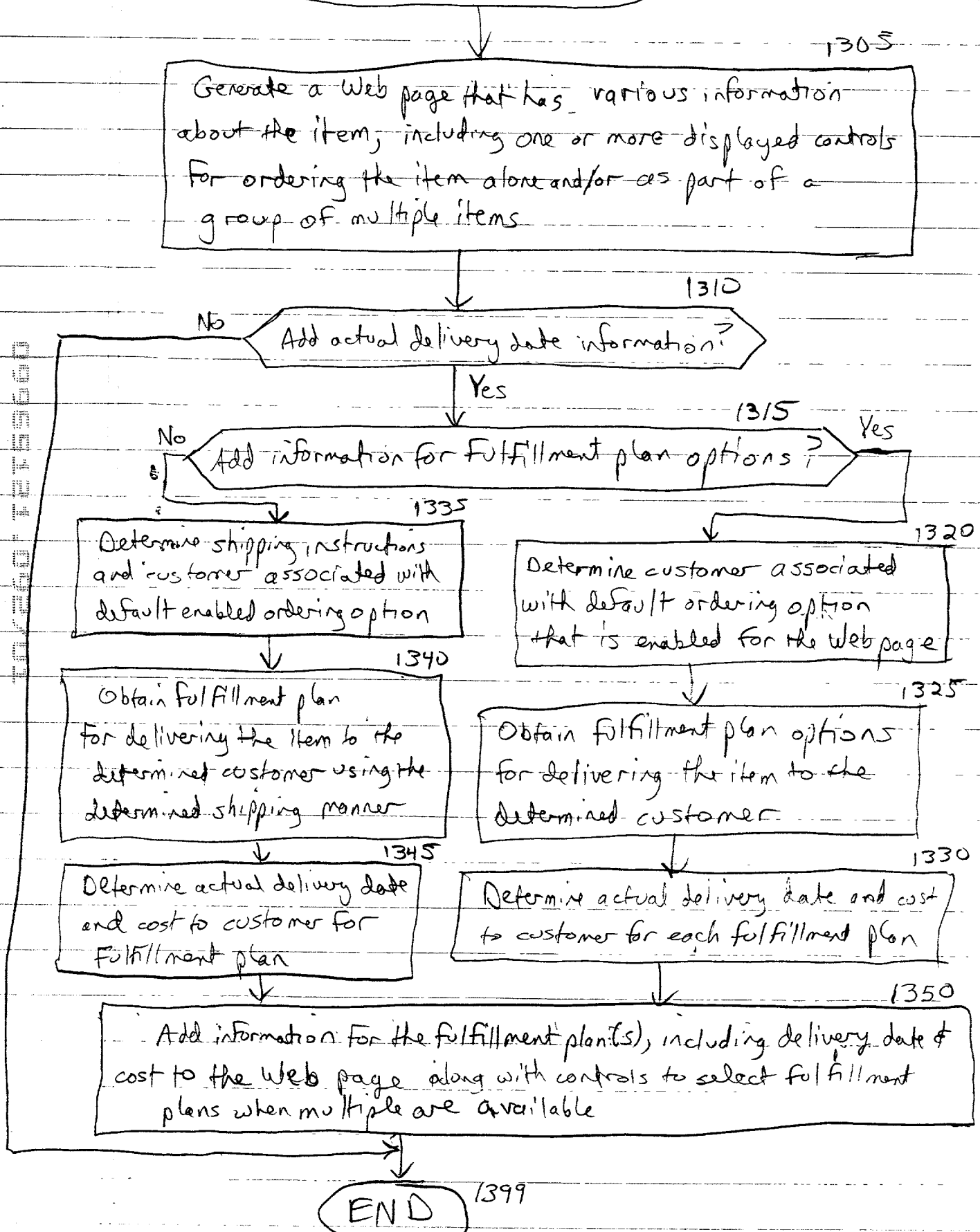
Web Server Item Web Page
Generation Routine

Fig. 14

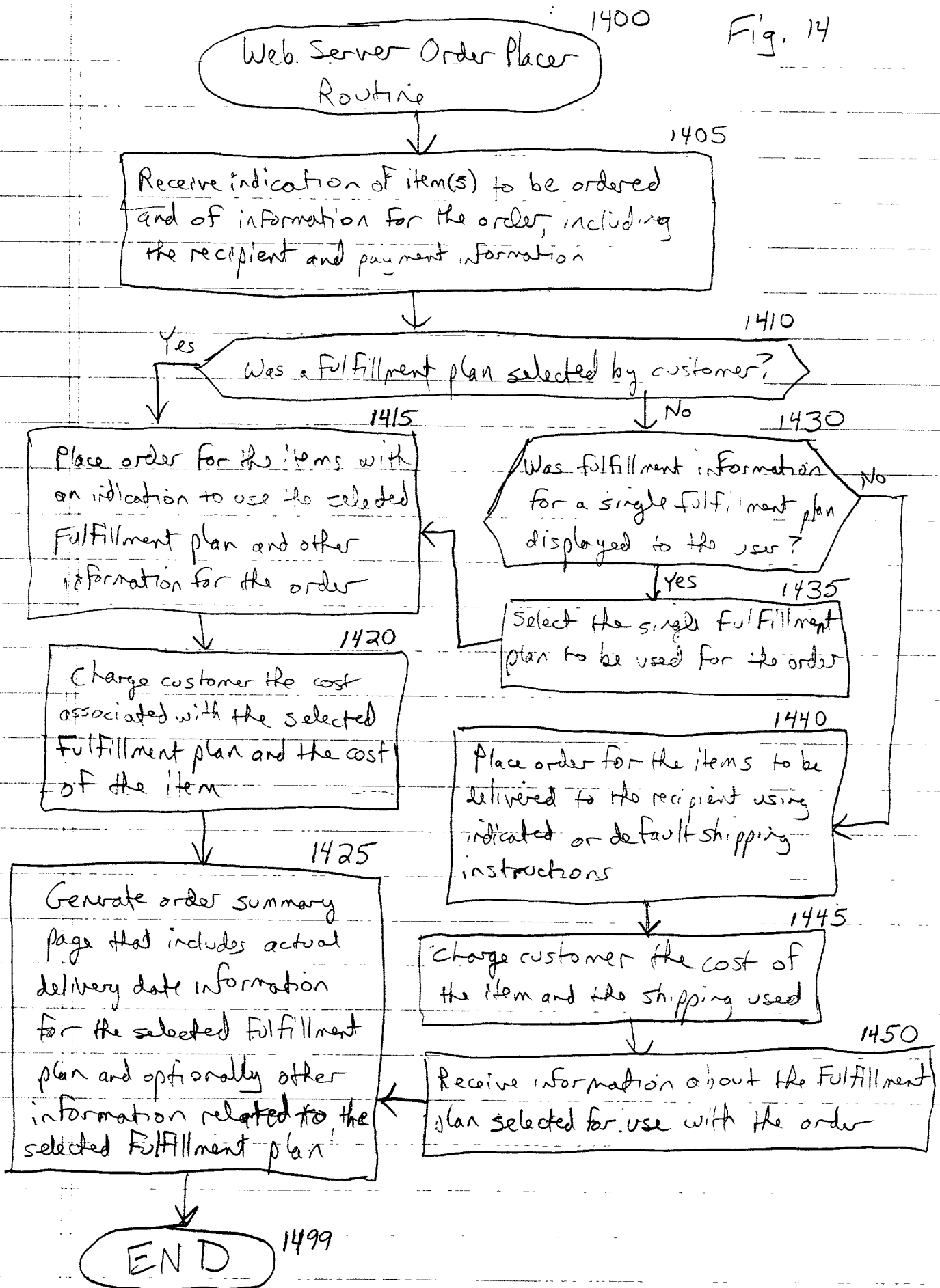
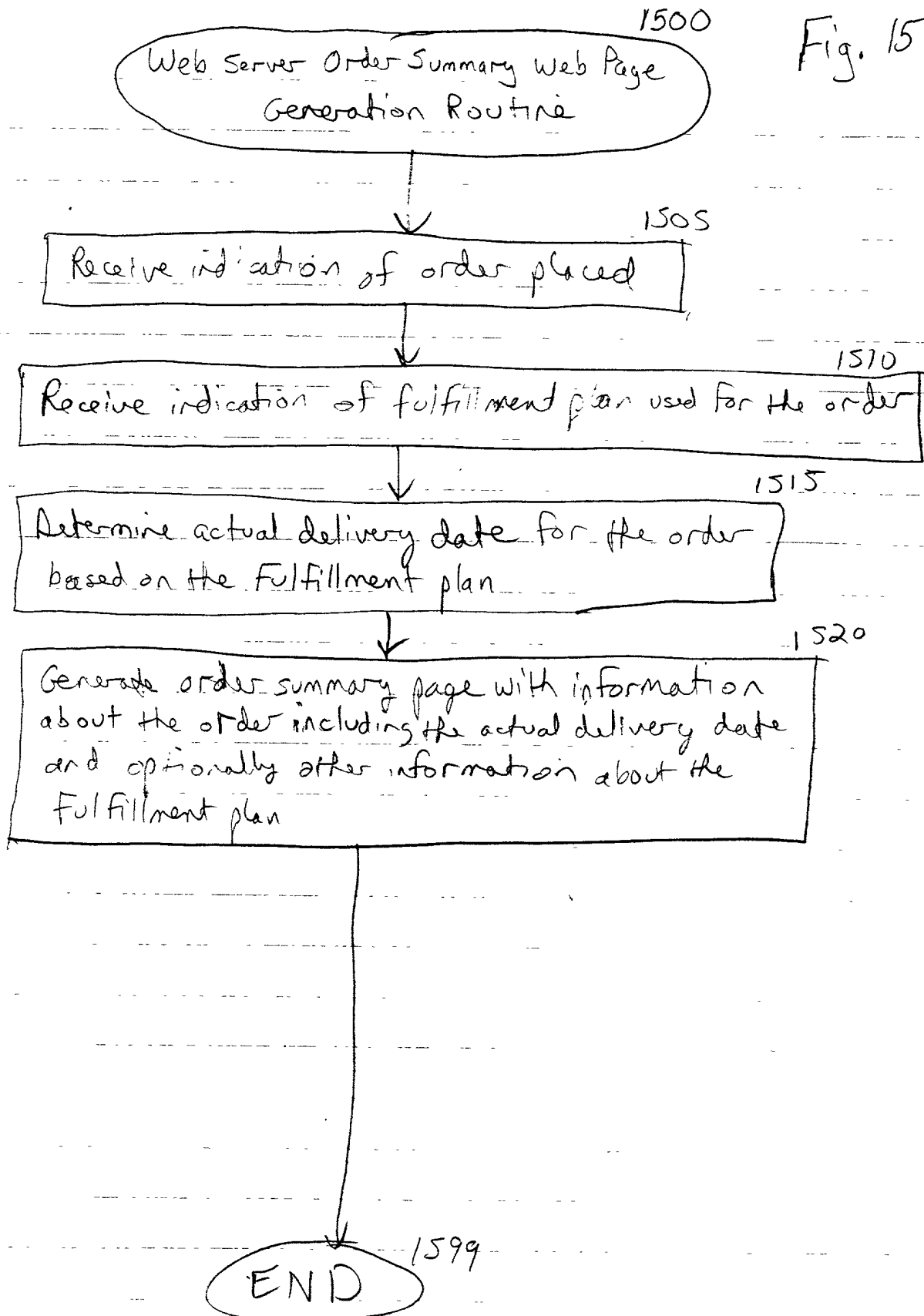


Fig. 15



1600

Fig. 16

Web Server Shopping Cart Web Page Generation Routine

1605
Receive indications of one or more items present
in the shopping cart

1610
For each item, determine whether a selected fulfillment plan
is associated with the item

1615
For items without associated fulfillment plans, obtain
fulfillment plan options for the items

1620
For items with associated fulfillment plans, obtain fulfillment
plan options for the items other than the associated plans

1625
Determine actual delivery dates and cost to customers for
each selected and determined fulfillment plan

1630
Generate a Web page that has information about each
of the items and the selected and determined fulfillment
plans, including actual delivery dates and costs, and that has
controls to order some or all of the items using any
fulfillment plans that are then selected

END

1699